

Lord Patel.
Chair, Lords Science and Technology Committee
Science and Technology Committee
House of Lords
London
SW1A 0PW

9 April 2021

Dear Lord Patel,

RE: the current issues facing R&D funding

I'm writing to share some background information relevant to your non-inquiry session into Government R&D Funding in 2021.

The UK Government has rightly identified research and innovation as key to its plan to 'unite and level up' and 'build back better' following COVID-19. Science is also central to its vision for Global Britain to 2030 in the Integrated Review of Security, Defence, Development and Foreign Policy. Investment in science is investment in the UK's future resilience, but it is important that the government's actions mirror its ambitions. It is therefore welcome that the Committee is scrutinising UK R&D funding.

This letter highlights information relevant to the Committee's enquiries and issues that it would be helpful to explore.

Funding for the UK's association to Horizon Europe

The 2020 Spending Review promised a £0.7 billion increase to the BEIS R&D budget for 2021-2022, contributing to an overall government R&D spend of £14.6 billion. It did not allocate money to cover the cost of association to Horizon Europe, or the provision of alternatives should the UK not associateⁱ. The Government previously recognised and committed to addressing the funding gap that would open-up if the UK did not associate to Horizon Europeⁱⁱ.

On 24 December 2020, the government confirmed the UK's intention to associate to Horizon Europe – a valuable commitment to international scientific collaboration – but it did not give an assurance that the money to pay for this will be additional to funds already committed to R&D. If the costs of association were to be covered from the BEIS R&D budget and exceeded £0.74 billion, this would result in a fall in the BEIS R&D budget in 2021-2022 on the previous year (note that this is before cuts to Official Development Assistance (ODA) funded R&D take effect, which further increase this fall), so creating a funding gap. The BEIS R&D budget includes UK Research & Innovation (UKRI), which delivers the majority of public funding for research and innovation in the UK.

Horizon Europe association – consisting of an annual operational contribution and a participation fee - is estimated to cost the UK approximately £2 billion per year over the lifetime of the Programme. However, the draft agreement allows for actual payments to be spread unevenly across the



President Sir Adrian Smith
Executive Director Dr Julie Maxton CBE

Founded in 1660, the Royal Society is the independent scientific academy of the UK, dedicated to promoting excellence in science.

Registered Charity No 207043

Programmeⁱⁱⁱ – although clarification is needed over whether government budgets will formally recognise this ‘backloading’ or need to account for the full cost each year. This means that the UK’s payment in 2021-2022 may be closer to £1 billion. Even a cost of £1 billion in 2021-2022 taken from the BEIS R&D budget would result in a fall on the 2020-2021 budget, resulting in damaging cuts to R&D investment.

The Royal Society highlighted the need to allocate money to cover the cost of this gap in its [Budget Representations](#)^{iv} and [wrote jointly with the other National Academies to the Chancellor ahead of the Budget](#)^v. However, no further funding was confirmed at Budget 2021. The Society subsequently published a document to highlight the mismatch between the UK government’s rhetoric about investment in research and innovation and its actions. This is available online: [The Government’s actions undermine its ambition for the UK to be a science superpower](#)^{vi} and includes a table summarising the UK Government’s recent R&D spending commitments – this table has been updated with the latest announcements in annex 1.

On 1 April 2021, the Government announced that it will be making available a further £250 million for R&D through BEIS in 2021-22^{vii}. This announcement also confirmed that a further £400 million of government investment in R&D will be redirected to pay for association to Horizon Europe (it is not clear whether this was previously part of the BEIS R&D budget). And subsequent reports^{viii} suggest that a further £350 million of BEIS R&D budget earmarked to cover the costs of alternatives in the event that the UK did not associate to Horizon Europe, will be made available. Together, this should ensure that the BEIS R&D Budget can absorb a £1 billion cost of association to Horizon Europe in 2021-2022 without making major cuts to existing spend. However, this should be viewed alongside a number of other pressures that are currently on the UK’s R&D budget – as outlined below.

The Government’s press release makes two claims that warrant further scrutiny:

- *“this takes total Government investment in R&D to £14.9 billion in 2021/22”*
This number is quoted before ODA cuts have taken effect. The total cut to R&D as a result of ODA cuts is difficult to quantify as it is split across departments, but Research Fortnight estimates that the total reduction in ODA funding for international development research between 2020-21 and 2021-22 now sits above £399m.^{ix}
- *“Despite these upfront payments the generous envelope for R&D means that, based on estimated receipts to our scientists from Horizon, overall public funds for UK scientists and innovators in 2021/22 will increase compared to 2020/21”*
If the cost of Association to Horizon Europe totals £1 billion in 2021-2022 and UK researchers are as successful in accessing Horizon Europe funding as they were at the peak of Horizon 2020, we can expect overall public funds for UK scientists and innovators in 2021-2022 to slightly increase on 2020-2021 (see annex 1). However, payments are not consistent over the course of the EU Framework Programmes.

In these difficult times, the additional £250 million announced on 1 April is a welcome contribution to the cost of association to Horizon Europe in 2021-2022, but there are a number of issues that it would be helpful to clarify. We will also share these with BEIS:

1. That the £14.9 billion figure cited as total Government investment in R&D in the 1 April press release does not account for the recent cuts to ODA expenditure on R&D.
2. Whether the £400 million earmarked at the Spending Review for 2021-22 to support Government priorities and drive the development of innovative ways to build new science capability that will now

help to pay for association to Horizon Europe was part of the BEIS R&D allocation, and whether any programmes will be impacted by its redirection.

3. Reports* suggest that a further £350 million of BEIS R&D budget earmarked to cover the costs of alternatives in the event that the UK did not association to Horizon Europe, will be made available. It would be helpful to clarify which budget this money is held within.
4. The Government's estimate of the annual operational contribution and participation fee for Horizon Europe.
5. How the 50% deferral of Horizon Europe payments in years one and two of the programme will be accounted for in budgeting terms. Will the deferred payments be assigned to the year in which they were incurred, or will they be included in the R&D budget of the years that they are deferred to – 2026-2027 and 2027-2028?
6. The Government's estimate of UK receipts from Horizon Europe per year.
7. The Government's planned multi-year R&D spending profile to 2025-2026 consistent with the spending period set out in Budget 2021.
8. The current status of the 'science ringfence' in relation to the above.^{xi}

Cuts to Official Development Assistance (ODA)

The Government announced its intention to temporarily reduce ODA, from 0.7% to 0.5% of gross national income in the 2020 Spending Review^{xii}. On 26 January, the Foreign Secretary confirmed^{xiii} that the BEIS ODA settlement for 2021/22 is £706m – which includes BEIS ODA spend on both International Climate Finance and R&D - a reduction from £1,038m in 2020-21. The weight of the cuts to the BEIS ODA budget have fallen on R&D. Other government departments supporting R&D through ODA funds are also experiencing cuts^{xiv}. The Royal Society is one of several delivery partners for BEIS ODA R&D funding and has suffered cuts to its programmes. Royal Society programmes funded from the BEIS ODA budget are being cut by around 70%. Royal Society Global Challenges Research Fund (GCRF) funding has gone down from £25.1m to £8.1m (which is 67%).

Case study: Future Leaders – African Independent Research (FLAIR) Fellowships

These Fellowships, delivered through a partnership between the African Academy of Sciences (AAS) and the Royal Society and supported through the GCRF, are for talented African early career researchers who have the potential to become leaders in their field. They provide the opportunity to build an independent research career in a sub-Saharan African institution and to undertake cutting-edge scientific research that will address global challenges facing developing countries.

Following the cuts to ODA funding, of 90 promising researchers, selected for being future leaders in their fields, only 30 will remain funded for one more year only. These are researchers working on issues such as global health and climate change.

The first 2019 cohort of Flair fellows, who were hoping to have extensions to their awards confirmed at the end of March, will not be issued with renewals. The Society planned to fund these promising scientists' careers for 3 more years and give them a solid foundation from which to grow into future leaders in their fields.

The Society is also unable to offer funding to the scheme's new intake for 2021, who have just undergone a rigorous and competitive interview process, and can no longer fund the 2020 cohort beyond this last year of funding.

The Government must consider the implications of these cuts to valuable global R&D projects in the light of its own ambitions to leverage the UK's science leadership in pursuit of new forms of global relationships. Science is at the heart of many of the solutions we desperately need right now. To solve our biggest challenges, the UK Government needs to continue to invest in and grow science talent and champions for evidence around the globe, not step back from this role. Global challenges can only be addressed by working in global collaboration. These are programmes, and relationships, that have taken years to build, and such deep cuts send a message that the UK is not a reliable partner in long-term science advancement across the globe. While we battle a once in a generation pandemic, and with the UK at the helm of the G7 and COP 26 climate summit, now is not the time for the government to row back from its ambitions to be a world leading science superpower^{xv}.

The Government has stated its intention for these cuts to be temporary and committed to "remain a world leader in international development and we will return to our commitment to spend 0.7% of gross national income on development when the fiscal situation allows."^{xvi} However, stop-start investment is destructive as research projects can span decades or even lifetimes. Once lost, research capacity takes time to rebuild, or will be lost as the UK will cede ground to other countries, damaging our competitiveness.

Now that the implications of the government's policy are clearer for research and development, the UK government must recognise the damage that is being inflicted to its ambitions as a science superpower and immediately take steps to provide clarity on the specific conditions that will enable a return to the 0.7% commitment, alongside immediate damage mitigation measures to vital research programmes and relationships around the world.

Long-term stability for R&D funding

The Government has made welcome commitments to invest £22 billion in UK R&D by 2024-2025 as part of a system-wide target for 2.4% of GDP to be invested in UK R&D by 2027, and 3% in the longer-term. However it is yet to spell out the spending profile to deliver this.

At a system level, securing stable long-term investment for UK research and innovation from diverse sources will put the sector on a strong and healthy footing from which it can employ and develop skilled people who can produce ground-breaking discoveries, world-changing innovations, and a robust modern economy. Stop-start investment is destructive as research projects can span decades or even lifetimes. Capacity can be permanently lost as we cede ground to our competitors.

While government support is critical, the UK will only maximise the benefits of public investment and achieve its target for 2.4% of UK GDP to be invested in R&D by 2027 by mobilising domestic and overseas business investment in R&D, which currently accounts for around two thirds of the UK's total R&D spend. Business needs certainty to invest. Multi-year funding commitments are needed to signal clearly to investors how increased public investment in R&D will be delivered, showcasing opportunities, providing confidence and informing long-term planning. Government rowing back on apparently robust public commitments to science so soon after making them, at a time when the benefits of long-term stability in science funding are so demonstrably visible in the pandemic response, will decrease confidence amongst private R&D investors in Government's stated policies as reliable investment signals.

While it is understandable that the COVID-19 pandemic led to the postponement of a Comprehensive Spending Review, replaced by a one-year Spending Review in which there were welcome efforts to provide some multi-year certainty for core research and innovation science, BEIS is yet to confirm its allocations to UKRI and delivery partners, including the Royal Society, for the current financial year, forcing delivery partners to operate at risk. To provide confidence and enable long-term planning, the **UK Government should use the Spending Review later this year to outline its planned spending profile to deliver its commitment of spending £22 billion per year on R&D by 2024/25 and ensure that research and innovation delivers for people, places, and the economic recovery across the UK.**

Funding shortfall for medical research charities

Medical research charities, whose overall funding was previously on a par with government investment in medical research across the UK, are projecting a shortfall in research spend of between £252 and £368 million in 2020-21 alone^{xvii}. Alongside other pressures on the R&D system, without urgent intervention, many critical research programmes and jobs are at risk.

The combined impact of these pressures on UK research and innovation

While each issue outlined above represents considerable immediate damage to the health of the UK's research and innovation system, their combined long-term impact is far greater. A heavy reliance on short-term contracts in academia, particularly among postdoctoral researchers, means that financial pressures on funding quickly limit career opportunities, stalling progression and potentially forcing early career researchers to exit the market^{xviii}. PhD students and researchers in industry are also at risk in this context. The cumulative effect will be a reduction in UK's skilled workforce and its absorptive capacity for innovation and growth at a time when delivering the government's ambitions for science and economic growth will require more people working in research and innovation. Our recent analysis of the research and technical workforce in the UK^{xix} suggests that the UK will not have the workforce in place to deliver the government's ambitions without additional action. This conclusion draws on data gathered before the impact of the pressures on the R&D budget outlined above are taken into account. Action is needed now to prevent a lost generation of researchers and innovators, and the long-term loss of competitiveness and economic scarring that this will engender.

It is also important to consider the global message that the UK is sending. Our international competitors understand that strategic advantage can be gained from increasing investment in science and are taking bold steps to maximise their research and innovation capabilities. China, for example, plans to increase its annual R&D spending by more than 7% in the next five years. The French government has announced that the budget of its National Research Agency will triple by 2023, and Spain has unveiled a budget that will see research spending increase by more than 80% this year. €20 billion has been set aside to turbocharge education, research and infrastructure over the next five years in the Netherlands, and Sweden has announced a 10% research and innovation budget increase by 2024. US investment in R&D is now at 3% of its GDP and China has hit an all-time high of 2.2%^{xx}.

I would like to thank your Committee for taking the time to examine these important issues. Please do contact my team on public.affairs@royalsociety.org for any further information. I will publish this letter on the Society's website.

Yours sincerely,



Sir Adrian Smith
President
president@royalsociety.org

ⁱ See table 1 - Royal Society (2021) *The Government's actions undermine its ambition for the UK to be a science superpower* <https://royalsociety.org/-/media/policy/Publications/2021/21-03-18-threats-to-r-and-d-budget.pdf> [accessed 30 March 2021]

ⁱⁱ HM Government (2020) *UK Research and Development Roadmap*

ⁱⁱⁱ *ANNEX 'UNPRO-1: IMPLEMENTATION OF THE FINANCIAL CONDITIONS' p 1051 of TCA confirms that demand for payment of half of the operational contribution for years 1 and 2 of Horizon Europe will be put back to 2026 and 2027, implying that the ~£2bn becomes £1bn until the UK pays the remainder:
-2021: 50% paid in 2021, 50% paid in 2026
-2022: 50% paid in 2022, 50% paid in 2027

^{iv} Royal Society (January 2021) *Budget Representations ahead of the March 2021 Budget* <https://royalsociety.org/-/media/policy/Publications/2021/01-14-21-Royal-Society-2021-Budget-Representations.pdf> [accessed 30 March 2021]

^v National Academies (March 2021) *Joint letter from the Presidents of the National Academies to the Chancellor of the Exchequer regarding association to Horizon Europe* <https://royalsociety.org/-/media/policy/Publications/2021/03-02-21-letter-to-the-chancellor-of-the-exchequer-from-presidents-of-the-national-academies.pdf> [accessed 30 March 2021]

^{vi} Royal Society (2021) *The Government's actions undermine its ambition for the UK to be a science superpower* <https://royalsociety.org/-/media/policy/Publications/2021/21-03-18-threats-to-r-and-d-budget.pdf> [accessed 30 March 2021]

^{vii} HM Government (2021) *£250 million additional funding to boost collaboration and protect ongoing research* [£250 million additional funding to boost collaboration and protect ongoing research - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/250-million-additional-funding-to-boost-collaboration-and-protect-ongoing-research) [accessed 7 April 2021]

^{viii} Research Professional (2021) *Government announces £250m top-up for Horizon Europe costs* <https://www.researchprofessional.com/0/rr/news/uk/politics/2021/3/Government-announces--250m-top-up-for-Horizon-Europe-costs.html#sthash.meNYqqqG.0GJBPI0Z.dpuf> [accessed 7 April 2021]

-
- ^{ix} Research Fortnight (22 March 2021) *Exclusive: ten more UK R&D funders have aid budgets slashed* <https://www.researchprofessional.com/0/rr/news/uk/politics/2021/3/Exclusive-analysis--ten-more-R-D-funders-have-aid-budgets-slashed.html#sthash.Ja8vwH0l.dpuf> [accessed 1 April 2021]
- ^x Research Professional (2021) *Government announces £250m top-up for Horizon Europe costs* <https://www.researchprofessional.com/0/rr/news/uk/politics/2021/3/Government-announces--250m-top-up-for-Horizon-Europe-costs.html#sthash.meNYggqG.0GJBPI0Z.dpuf> [accessed 7 April 2021]
- ^{xi} See National Academies (2019) UKRI explainer for a definition of the science ring-fence <https://royalsociety.org/-/media/policy/Publications/2019/03-10-19-ukri-explainer.pdf> [accessed 8 April 2021]
- ^{xii} The National Academies wrote to the Foreign Secretary in December 2020 to highlight our concern over the potential impact of these cuts on R&D <https://royalsociety.org/topics-policy/publications/2020/letter-from-presidents-of-the-national-academies-to-foreign-secretary-proposed-cuts-to-oda-funding/> [accessed 31 March 2021]
- ^{xiii} HM Government (2021) *Written Ministerial Statement UIN HCWS735* <https://questions-statements.parliament.uk/written-statements/detail/2021-01-26/hcws735>
- ^{xiv} Research Fortnight (2021) *Budget for NIHR global health schemes drops 28%* [Research Professional - Budget for NIHR global health schemes drops 28%](https://www.researchprofessional.com/0/rr/news/uk/politics/2021/3/Budget-for-NIHR-global-health-schemes-drops-28%) [accessed 31 March 2021]
- ^{xv} Royal Society (2021) *Royal Society response to the Foreign Secretary's cross-government review of Official Development Assistance (ODA) allocations* <https://royalsociety.org/news/2021/01/royal-society-oda-response/> [accessed 31 March 2021]
- ^{xvi} HM Government (2021) *Global Britain in a Competitive Age: the Integrated Review of Security, Defence, Development and Foreign Policy*
- ^{xvii} AMRC (2020) *Charity CEOs warn of irreparable damage to UK research* <https://www.amrc.org.uk/news/charity-ceos-warn-of-irreparable-damage-to-uk-research> [accessed 31 March 2021]
- ^{xviii} Nuffield Council on Bioethics (2014) *The culture of scientific research in the UK* https://www.nuffieldbioethics.org/wp-content/uploads/Nuffield_research_culture_full_report_web.pdf [accessed 1 April 2021]
- ^{xix} Royal Society (2021) *The Research and Technical Workforce in the UK* <https://royalsociety.org/topics-policy/publications/2021/research-and-technical-workforce-uk/> [accessed 1 April 2021]
- ^{xx} AAAS (25 March 2021) *New Data Says U.S. R&D Has Topped 3% of GDP For the First Time Ever* [New Data Says U.S. R&D Has Topped 3% of GDP For the First Time Ever | American Association for the Advancement of Science \(aaas.org\)](https://www.aaas.org/news/new-data-says-u-s-r-d-has-topped-3-of-gdp-for-the-first-time-ever) [accessed 7 April 2021]